NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD AND SPECIFICATION

IRRIGATION STORAGE RESERVOIR

(number and acre-feet)
CODE 436

DEFINITION

An irrigation water storage structure made by constructing a dam.

PURPOSE

- Conserve water by holding it in storage until it can be beneficially used to meet crop irrigation requirements.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies only to sites meeting all the following criteria:

The water supply available to the irrigated area is insufficient to meet conservation irrigation requirements during part or all the irrigation season.

Water is available for storage from surface runoff, streamflow, or a subsurface source during periods of low or non-irrigation use.

Topographic, geologic, and soils condi-tions are satisfactory for constructing an economically feasible storage reservoir.

This standard pertains to the planning and design of irrigation storage reservoirs. It does not include detailed design criteria or construction specifications or individual structures or components of the storage facility. **Earth dams and related structural appurtenances shall meet conservation practice standard and specification Pond (378) criteria**.

This standard applies to irrigation water storage structures designed to be filled during the season of low irrigation demand to provide needed. It does not apply to structures designed primarily for flow control or to store water for only a few hours or days.

CRITERIA

General. All federal, state, and local regulations shall be followed through the design and construction of a irrigation storage reservoir.

Irrigation. The amount of water required to properly irrigate the crops. The variations in water demand within the growing season must be known to adequately evaluate storage requirements. All demand hydrographs shall be computed from the consumptive use-time relationship. Increase storage volume to reflect the anticipated level of farm irrigation efficiency plus any losses expected in conveying the water from the source to the delivery point. If water is required for such purposes as leaching or frost control, the amount needed shall be included in the demand hydrograph.

Storage capacity. Irrigation storage reservoirs shall be designed to have a usable capacity sufficient to satisfy irrigation requirements in the design area. A minimum of one-half (50%) of usable capacity shall be provided for each acre to be irrigated. Additional capac-ity shall be provided as needed for sediment storage and evaporation. The mean annual evaporation from lakes in Missouri, Missouri Supplement to Chapter 2 of the Engineering Field Handbook may be used to determine evaporation losses.

The stored water releases required to meet irrigation demands shall be those increments of the water demand hydrograph that exceed the available direct flows from other sources.

The reservoir capacity required to satisfy irrigation demands shall consider 1) the length of the storage period, 2) the antici-

pated inflow during this period, and 3) the seepage and evaporation losses to be expected under the proposed plan of operation.

Storage capacity can be limited by the characteristics of the site. When the water supply available for storage is insufficient to meet these demands, the quantity of water shall be computed to evaluate the benefits of the proposed installation. The benefits may be evaluated on the basis of the more frequent availability of water for the entire area served.

Water from surface runoff. The watershed area shall be of sufficient size to produce enough runoff for irrigation demands. It shall be protected from erosion by use of effective soil conservation practices in order to reduce siltation of the reservoir. In determining the runoff that might be expected from a watershed, consideration should be given to the vegetative cover as well as other conservation practices in the water-shed. The drainage area shall not be less than two acres for each acre-foot of storage unless supplemented by pumping or stream flow.

In the design of the irrigation reservoir, consideration should be given to the possibility of two consecutive dry years.

Water from streams. Stream water may be pumped into the reservoir at any time during the year and held in reserve until needed for irrigation. Pumping shall not affect the flow of the stream. **If permanent pumping works are being considered, contact the appropriate Corps of Engineers district office, regulatory branch, to request a permit determination.**

Water from wells. The reservoir capacity will depend on the normal discharge of the well. The capacity (reservoir storage and discharge from the well) will be adequate to supply the irrigation demands during periods of greatest crop water use.

Types of structures. The type of dam and associated structures shall be selected for each site. Consider hydrologic studies, engineering investigations, and geologic investigations of the site conditions.

The reservoir may be created by an impounding embankment used to intercept surface runoff or by an enclosed embankment used to store pumped water.

Foundation, embankment and spillway. Earthen dams and embankments and associated structures shall be designed to meet the criteria in the conservation practice standard for ponds (378) or in TR-60, Earth Dams and Reservoirs, as appropriate.

Drop spillways, chute spillways, and box spillways shall be designed according to the principles set forth in the Engineering Field Handbook or the National Engineering Handbook, as appropriate.

Overflow protection. An overflow protection structure with a capacity equal to or greater than the inlet stream shall be provided for an embankment. This structure may be designed and installed in combination with the outlet spillway.

Outlet works. Outlet works shall be provided for the controlled release of irrigation water. Outlet works may consist of a gated conduit through or over the dam for gravity flow to the irrigated area or to a pumping plant.

The capacity of the outlet works shall not be less than that required to meet peak period irrigation system demands.

VEGETATION

Vegetation shall be established on all constructed or other disturbed areas according to the conservation practice standard for Critical Area Planting (342).

PLANS AND SPECIFICATIONS

Plans and specifications for constructing irrigation storage reservoirs shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purposes.

Irrigation storage reservoirs within the scope of the conservation standard standard for Pond (378) shall be constructed according to the construction and material specifications for ponds. Those within the scope of the criteria in TR-60 shall be constructed according to guide specifications in the National Engineering Handbook, Section 20.

OPERATION AND MAINTENANCE

A written operation and maintenance plan shall be developed with input from the owner-operator. Some items to be included in the plan and checked at the site periodically and after large rains are dam topwidth and sideslopes, outlet works, condition of shoreline, and condition of vegetation.

The following University of Missouri Agricultural Guide provides information on operating and maintaining structures with embankment dams:

1548 “Maintaining Small Dams”